



## Tailored stakeholder products help provide a vulnerability and adaptation assessment of Greek forests due to climate change

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Greece, being part of the eastern Mediterranean basin, is an area particularly vulnerable to climate change and associated forest fire risk. The aim of this study is to assess the vulnerability of Greek forests to fire risk occurrence and identify potential adaptation options within the context of climate change through continuous interaction with local stakeholders. To address their needs, the following tools for the provision of climate information services were developed:

1. An application providing fire risk forecasts for the following 3 days (<http://cirrus.meteo.noa.gr/forecast/bolam/index.htm>) was developed from NOA to address the needs of short term fire planners.
2. A web-based application providing long term fire risk and other fire related indices changes due to climate change (time horizon up to 2050 and 2100) was developed in collaboration with the WWF Greece office to address the needs of long term fire policy makers (<http://www.oikoskopio.gr/map/>).
3. An educational tool was built in order to complement the two web-based tools and to further expand knowledge in fire risk modeling to address the needs for in-depth training.

In particular, the second product provided the necessary information to assess the exposure to forest fires. To this aim, maps depicting the days with elevated fire risk ( $FWI > 30$ ) both for the control (1961-1990) and the near future period (2021-2050) were created by the web-application. FWI is a daily index that provides numerical ratings of relative fire potential based solely on weather observations. The meteorological inputs to the FWI System are daily noon values of temperature, air relative humidity, 10m wind speed and precipitation during the previous 24 hours. It was found that eastern lowlands are more exposed to fire risk followed by eastern high elevation areas, for both the control and near future period.

The next step towards vulnerability assessment was to address sensitivity, ie the human–environmental conditions that can worsen or ameliorate the hazard. In our study static information concerning fire affecting factors, namely the topography and vegetation, was used to create a fire hazard map in order to assess the sensitivity factor. Land cover types for the year 2007 were combined with topographic information deriving from a digital elevation model order to produce these maps. High elevation continental areas were found to be the most sensitive areas followed by the lowland continental areas. Exposure and sensitivity were combined to produce the overall impact of climate change to forest fire risk.

The adaptive capacity is defined by the ability of forests to adapt to changing environmental conditions. To assess the adaptive capacity of Greek forests, a Multi-Criteria Analysis (MCA) tool was implemented and used by the stakeholders. The major proposed adaptation measures for Greek forests included fire prevention measures and the inclusion of the private forest covered areas in the fire fighting.

Finally, vulnerability of Greek forest to fire was estimated as the overall impact of climate change minus the forests' adaptive capacity and was found to be medium for most areas in the country.

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